भारतीय मानक
Indian Standard

IS 17992 : 2022

अतिशोषक बहुलक — स्वच्छता उत्पादो के लिए सोडियम पॉलीक्रिलेट रेज़िन — विशिष्टि

Superabsorbent Polymer — Sodium Polyacrylate Resin For Hygiene Products — Specifiction

ICS 83.140.99

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Price Group 8

Plastics Sectional Committee, PCD 12

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Plastics Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

Superabsorbent polymers are primarily used as an absorbent for water and aqueous solutions. Superabsorbent polymer (SAP) can absorb and retain extremely large amounts of a liquid relative to its own mass.

Superabsorbent polymer of sodium polyacrylate resin used in diapers, adult incontinence products, feminine hygiene products (such as sanitary towels and pads), medical products (such as tourniquets and surgery coats) and similar applications. The other applications of SAP are in Agriculture, wire and cable, construction etc.

Requirements of SAP depends upon the type of applications (thin or thick diaper, overnight diaper, etc.

Residual monomer (RM) is important characteristics as it is related to health and safety of the end product user. Higher value could be harmful to skin and hence it is kept as low as possible when used for the hygiene application.

Considerable assistance has been derived from the following while formulating the standard:

a) ISO 19699-1:2017 ‘Superabsorbent polymer — Sodium polyacrylate resin for absorbing blood — Part 1: Test methods
b) ISO 19699-2:2017 ‘Superabsorbent polymer — Sodium polyacrylate resin for absorbing blood — Part 2 Specifications issued by the International Organization for Standardization (ISO) while formulating the standard
c) ISO 24669 : 2021 Water-absorbent polyacrylate in urine absorbing products — Requirements and
d) Technical data provided by Bharat Petroleum Corporation Limited, Noida.

Information on properties of the human blood can be found in James S.H., Kish P.E. and Sutton T.P. Principles of Bloodstain Pattern Analysis: Theory and Practice. This information is given for the convenience of users of this standard and does not constitute an endorsement.

This Standard is under development on the recommendation of Department of Chemicals and Petrochemicals.

The composition of the Committee responsible for formulation of this standard is given in Annex E.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*). The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SUPERABSORBENT POLYMER — SODIUM POLYACRYLATE RESIN FOR HYGIENE PRODUCTS — SPECFICATION

1 SCOPE

1.1 This standard prescribes the requirements and method of test for superabsorbent polymer (SAP) made from sodium polyacrylate resin for absorbing blood and urine.

1.2 This standard applies to sodium polyacrylate resin, as raw material, and applies to SAP for the final products used for absorbing blood and urine.

2 REFERENCE

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreement based on standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No./ Other Publication	Title
ISO 758 : 1976	Liquid chemical products for industrial use — Determination of density at 20°C
ISO 6388 : 1989	Surface active agents — Determination of flow properties using a rotational viscometer
ISO 17190-1: 2001	Urine-absorbing aids for incontinence – Polyacrylate superabsorbent powders – Part 1: Test method for determination of pH
ISO 17190-2: 2001	Urine-absorbing aids for incontinence – Polyacrylate superabsorbent powders – Part 2: Test method for determination of the amount of residual acrylate monomers
ISO 17190-3: 2001	Urine-absorbing aids for incontinence — Polyacrylate superabsorbent Part 3:Test method for determine fractionation
ISO 17190-4: 2001	Urine-absorbing aids for incontinence – Polyacrylate superabsorbent powders
ISO 17190-6: 2020	Urine-absorbing aids for incontinence — Polyacrylate superabsorbent powders — Part 6: Test method for determination of the fluid retention capacity in saline solution by gravimetric measurement following centrifugation
ISO 17190-7: 2020	Urine-Absorbing Aids for Incontinence – Test Methods for Characterizing Polymer-Based Absorbent Materials – Part 7: Gravimetric Determination of Absorption under Pressure
ISO 17190-9: 2020	Urine-absorbing aids for incontinence — Polyacrylate superabsorbent powders
ISO 2470-2	Paper, board and pulps — Measurement of diffuse blue reflectance factor — Part 2 Outdoor daylight conditions (D65 brightness)
EN 14370	Surface active agents - Determination of surface tension

3 TERMINOLOGY

For the purposes of this standard, the following terms and definitions apply.

3.1 Superabsorbent Polymer (SAP)

Polymer that can absorb and retain extremely large amount of liquid relative to its mass.

NOTES

1 Absorption is dependent on liquid type**.** It is insoluble in water or organic solvents.

2 However, after it has contacted with water, in a short time it swells into gel. Even an external pressure cannot force out the liquid.

3.2 Residual Monomer

Unreacted chemical compound(s) used to build the polymeric chains, which is still present in the final polymeric material.

3.3 Amount of Residual Monomers

Quantity of remaining sodium acrylate and acrylic acid in the sodium polyacrylate resin, expressed in milligrams per kilogram (mg/kg).

3.4 Volatile Content

Quantity of water and other small molecules in the sodium polyacrylate resin, expressed as a percentage by mass.

3.5 Particle Size Distribution

Percentage of each of fraction of the particles based on mass.

3.6 Bulk Density

Mass of sodium polyacrylate resin per unit volume after free fall including voids.

3.7 Simulated Blood

Solution having a similar absorption trend as in human blood.

3.8 Simulated Blood Absorption Capacity

Amount of simulated blood (*see* **3.6**) absorbed by 1 g of sodium polyacrylate resin after a set amount of time.

3.9 Simulated Blood Absorption Rate

Time taken for 1 g of sodium polyacrylate resin to absorb 5.0 ml of simulated blood (*see* **3.6**).

4 TYPE AND CLASS

4.1 Type

Superabsorbent Polymer (SAP) shall be of the following types:

a) Type A — SAP for absorbing blood in hygiene products like sanitary napkins; and

b) Type B — SAP for absorbing urine in hygiene products like baby and adult diapers.

4.2 Class

Superabsorbent Polymer (SAP) for absorbing blood (Type A) shall be of the following class:

Class I
Class II

The classification is based on the simulation blood absorption rate.

5 REQUIREMENTS

5.1 Appearance

The visual appearance of sodium polyacrylate resin shall be white solid.

5.2 The material for absorption of blood and urine shall also comply with the requirements prescribed in Table 1 and Table 2 when tested according to the method prescribed in col 5 of Table 1 and col 4 of Table 2 respectively.

Table 1 Requirement of SAP for Absorbing Blood (Type A)
(*Clause* 5.2)

Sl No	**Characteristic**	**Requirement of SAP for Absorbing blood in Hygiene Products**		**Method of Test, Refer to**
		Class I	Class II	
(1)	(2)	(3)	(4)	(5)
i)	Amount of residual monomers, mg/kg, *Max*	1 000	1 000	ISO 17190-2
ii)	Moisture content, percent, *Max*	10.0	10.0	ISO 17190-4
iii)	*p*H	5.0 to 8.0	5.0 to 8.0	ISO 17190-1
iv)	Particle size distribution, percent	≤ 5 for particle size less than 150 µm	≤ 5 for particle size less than 106µm	ISO 17190-3
		≤ 1 for particle size less than 106 µm	≤ 1 for particle size less than 45 µm	
v)	Bulk density, g/cm^3	0.65 to 0.80	0.30 to 0.90	ISO 17190-9
vi)	Simulated blood absorption capacity, g/g, *Min*	15	15	Annex A
vii)	Simulated blood absorption rate, s	≤ 50	> 50	Annex B
viii)	Whiteness, percent, *Min*	70	70	Annex C
ix)	Absorption under load, AUL (0.0207 bar (0.3 psi)), g/g, *Min*	10	---	ISO 17190-7

Table 2 Requirement of SAP for Absorbing Urine (Type B)
(*Clause* 5.2)

Sl No	**Characteristic**	**Requirement of SAP for Absorbing Urine in Hygiene Products**	**Method of Test, Refer to**
(1)	(2)	(3)	(4)
i)	Amount of residual monomers, mg/kg, *Max*	1 000	ISO 17190-2
ii)	Moisture content, percent, *Max*	10.0	ISO 17190-4
iii)	*p*H	4.5 to 8	ISO 17190-1
iv)	Particle size distribution, percent	≤ 5 for particle size less than 150µm	ISO 17190-3
		≤ 1 for particle size less than 106 µm	
v)	Bulk density, g/cm^3	0.30 to 1.00	ISO 17190-9
vi)	Absorbing capacity, g/g, *Min*	10.0	ISO 17190-6
vii)	Absorption under load, AUL (0.0207 bar (0.3 psi)), g/g, *Min*	10	ISO 17190-7
viii)	Whiteness, percent, *Min*	70	Annex C
ix)	Heavy metals, mg/kg	Less than 20	Annex D

6 PACKING AND MARKING

6.1 Packing

The material shall be packed in suitable form of packing, as agreed to between the purchaser and the supplier. The packaging bag shall be smooth and should maintain the integrity of the raw material during transportation, storage and handling. The package shall be waterproof and moisture proof.

6.2 Marking

6.2.1 Each container/package shall be clearly marked with the following:

a) Type and/or Class;
b) Net mass of the material, the manufacturer's name, trademark or identification mark;
c) Lot number;
d) Date of manufacture and date of expiry; and
e) Any other statutory requirement.

6.2.2 *BIS Certification Marking*

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

7 SAMPLING

7.1 GENERAL

In drawing, preparing, storing and handling samples, the precautions and directions given in 7.1.1 to 7.1.6 shall be observed.

7.1.1 Samples shall not be taken in an exposed place.

7.1.2 The sampling instrument shall be of stainless steel or any other suitable material on which the material shall have no action. The instrument shall be clean and dry.

7.1.3 Precautions shall be taken to protect the samples, the materials being sampled, the sampling instrument and the containers for samples from adventitious contamination.

7.1.4 The samples shall be placed in a suitable clean, dry, air-tight, plastic/metal/glass container on which the material has no action. The sample container shall be of such a size that it is almost completely filled by the sample.

7.1.5 Each sample container shall be sealed air-tight with a stopper after filling and marked with full details of sampling, such as the date of sampling, the month and year of manufacture of the material, etc.

7.1.6 Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal temperature.

7.2 Scale of Sampling

7.2.1 *Lot/Batch*

For continuous chemical processes like polymer production, the sampling shall be done from sealed bags/packages or other representative sampling points after proper homogenization of the material.

To get the representative samples from the entire lot/batch, random sampling to be done from the entire lots/batches irrespective of the size of lot/batch. The number of sampling to be done as per Table 3 based on the quantity of the lot/batch.

Table 3 Number of Containers to be Selected for Sampling
(*Clause* 7.2.1)

Lot Size (MT) (1)	Number of the Sealed Bag/Package for Sampling (2)
Up to 600	3
> 600 to 1 000	4
➢ 1 000	5

Approximately 1 kg (or higher quantity required for testing) of sample collected from each of the above sealed bag in to a clean plastic bag to have approx. 3 kg composite sample. Proper mixing is to be done for homogenization of composite sample before testing.

Based on the requirement of testing, the portion of the composite sample will be stored properly in two containers as mentioned in clause **7.1.4**. Sample of the one container will be used for testing in front of inspection authority at manufacturer site/laboratory. The other sample container will be stored (maximum 6 months) and properly labelled as Reference sample for the testing in future if it is required in case of any dispute or other requirement.

7.3 Sampling Instrument

7.3.1 The sampling instrument made of stainless steel shall be as shown in Fig. 1. It shall be capable of taking samples from all points when inserted into the container/bag. In case of FFS bag (multilayer film sack) sampling may be done by opening the bag and collect the sample.

7.3.2 From each of the containers/bags selected, portions of the material shall be drawn with the help of the sampling instrument. The total quantity of the material collected from each container/bag

7.4 Number of Tests

7.4.1 Tests for the Superabsorbent polymer shall be done as per Table 1 or Table 2, as applicable and shall be conducted individually from a portion of composite samples, kept in the bottle/container.

7.5 Criteria for Conformity

a) Each of the test results for SAP shall satisfy the corresponding requirements given in Table 1 or Table 2, as applicable.

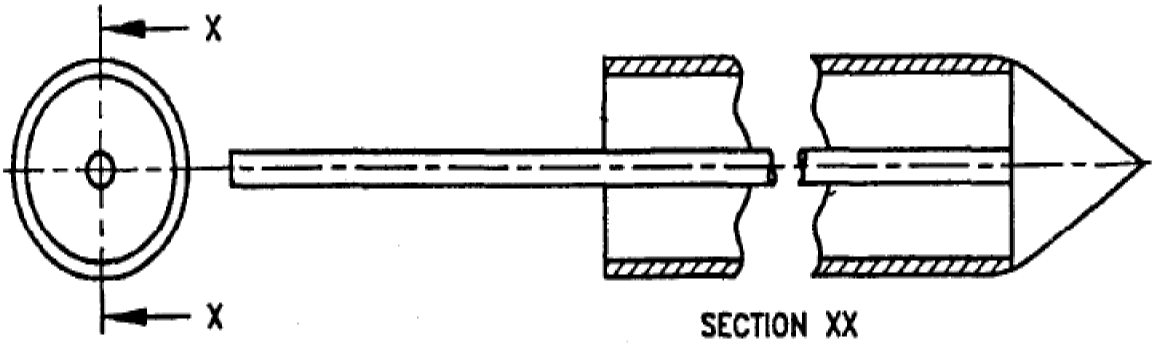


FIG. 1 SAMPLING INSTRUMENT

ANNEX A

DETERMINATION OF SIMULATED BLOOD ABSORPTION CAPACITY

[*Table* 1, *Sl. No*. vi)]

A-1 PRINCIPLE

The quantity of the simulated blood absorbed in a defined time is weighed.

A.2 REAGENTS

A-2.1 Simulated Blood

The solution of simulated blood shall be prepared in accordance with the following procedure:

A-2.1.1 *General*

Simulated blood is prepared to mimic the major physical properties of human blood. The solution prepared shall have similar liquidity and viscosity properties as well as the characteristics that of the human blood.

A-2.1.2 *Formulation*

Use only analytical grade reagents, unless otherwise specified. The chemical formulation of simulated blood is as follows:

a) Deionized water (complying with ISO 3696, grade 3): 860.000 g ± 1.000 g
b) Sodium chloride: 10.000 g ± 0.010 g
c) Sodium carbonate: 40.000 g ± 0.040 g
d) Glycerin: 140.0 ml
e) Sodium benzoate: 1.000 g ± 0.001 g
f) Blue colouring: 0.050 ml
g) Sodium carboxymethylcellulose (molecular weight is 25 000): and 5.000 g ± 0.005 g
h) Surface tension modifier (containing fluorine surfactant of non-ionic polymerization): 10.0 ml

A-2.2 Physical Properties of Simulated Blood

The properties of simulated blood at 23 ± 1°C shall satisfy the requirements as given in Table 4.

Table 4 Property Requirements for Simulated Blood
(*Clause A-2.2*)

Sl No.	Characteristic	Requirement	Method of Test, Refer to
(1)	(2)	(3)	(4)
i)	Density, g/ml	1.05 ± 0.05	ISO 758
ii)	Viscosity, mPa·s	7.3 ± 1.1	ISO 6388
iii)	Surface tension, mN/m	40 ± 4	EN 14370
iv)	*p*H	11.0 ± 0.1	ISO 6353-1

NOTE — The test methods and simulated blood as given in this annex shall apply to sodium polyacrylate resin, as raw material, and SAP for the final products used for absorbing blood only.

A-2.3 Procedure

A-2.3.1 Sequentially weigh 10.00 g of sodium chloride, 40.00 g of sodium carbonate, 1.00 g of sodium benzoate and 5.00 g of sodium carboxymethylcellulose with an analytical balance, and place them together into a beaker of 2 000 ml.

A-2.3.2 Measure 140.0 ml of glycerin using a 250 ml graduated cylinder and pour them into the mixture in **A-2.3.1.** Measure 860 g of distilled water with the above analytical balance and pour them into the mixture in **A-2.3.1** mixing well.

A-2.3.3 Take 300 ml using a 500 ml graduated cylinder of **A-2.3.2** mixed liquid into the mixer, turn on the switcher mixer and simultaneously start the timer. After 7 min, stop stirring and pour out the mixture. Mix the remaining liquid using the above method.

A-2.3.4 Mix the mixture obtained in **A-2.3.3**, repeating the method described in **A-2.3.3** again. Add 10.0 ml surface tension modifier and 0.05 ml of blue colouring to the mixture and stir until evenly coloured. Leave for 24 h before using.

A-3 APPARATUS

A-3.1 *Analytical Balance* capable of weighing up to 100 g, to the accuracy 0.000 1 g.

A-3.2 *Polyamide "Tea Bag"*, of 300 mesh with dimensions 100 mm × 150 mm and a basis weight of 58 ± 2 g/m^2.

A-3.3 *Glass Beaker*, of 2 000 ml capacity.

A-3.4 *Timer*, Accurate to 0.1 s over 60 min.

A-3.5 *Drying Rack or Line with Clips*.

A-3.6 *Thermometer*, of 100°C measuring range.

A-4 SAMPLING

A-4.1 In order to guarantee that a representative sample is taken from the bulk material contained in a large bag or a silo truck, remove the top layer (approximately 20 cm thick). Take a sample of 500 g or more with a scoop and place it in an airtight container of adequate size within 3 min after sampling.

A-4.2 Keep the test samples in a closed container and allow them to equilibrate to the ambient laboratory temperature before taking a test portion to carry out the test. Carry out the test at ambient conditions and report the temperature and relative humidity.

SAFETY PRECAUTIONS — USE RESPIRATORY PROTECTION, DUST MASK OR FUME HOOD WHEN HANDLING SAMPLE AMOUNTS GREATER THAN 10 G.

A-5 PROCEDURE

A-5.1 Weigh (1.000 ± 0.005) g of sample to be tested using a spoon which accommodates to take 1.0 g sample by a weighing paper. Record the mass of sample as m_0. Place all sample in the bottom of the tea bag (***see*** **A-3.2**) and make sure that any sample attached to the inner sides of the tea bag is also put in the bottom of the tea bag. Heat seal about 3 mm to 5 mm from the open edges.

A-5.2 Fill the beaker (*see* **A-3.3**) with 1 800 ml simulated blood (*see* **A-2.1**), and put two sets of two tea bags (**A-5.1**) into the beaker, keeping the simulated blood surface 2 cm higher than the tea bags, and simultaneously start the timer.

A-5.3 After 30 min, remove the tea bags from the simulated blood in order, fold the tea bags about half from the left top corner, and hang them on the drying rack with clip according to the serial number, keeping about 45°

A-5.4 Let the liquid drip for 10 min while the tea bags are maintained motionless. When multiple tea bags that contain sample are hung, they should not come into contact with each other. Weigh the tea bag containing the sample and record the mass as m_1.

A-5.5 Use the same procedure to prepare the tea bags that have been used above and do not contain the sample to test the blank value. Weigh the empty tea bag and record the mass as m_2.

A-6 CALCULATION AND EXPRESSION OF RESULTS

The simulated blood absorption capacity

$$m = \frac{m_1 - m_2 - m_0}{m_0}$$

where

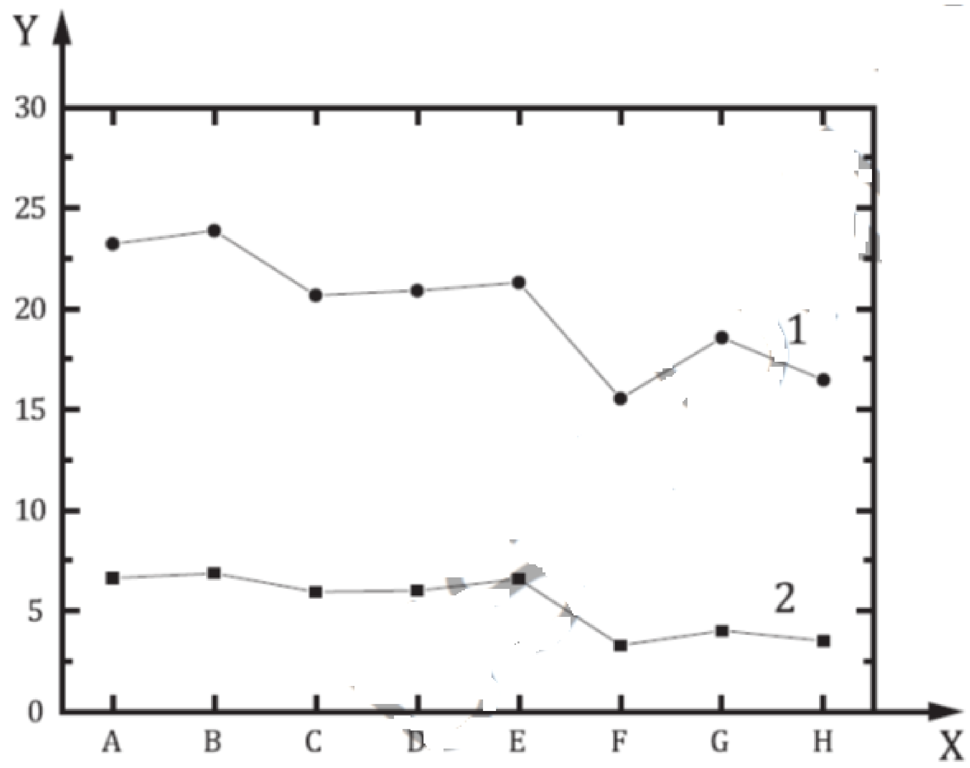
m = capacity of absorbing simulated blood, expressed in grams per gram;

m_1 = mass of the tea bag containing sample after absorbing simulated blood, expressed in grams;

m_2 = mass of the empty tea bag, expressed in grams; and

m_0 = mass of sample, expressed in grams.

Two tests shall be conducted simultaneously and the arithmetic mean of these two measurements accurate to one decimal place shall be used as the result. Fig. 1 provides a comparison of human blood and simulated blood absorption capacity of SAP.



X	samples	1	simulated blood
Y	absorption capacity (g/g)	2	human blood

FIG. 1 COMPARISON OF HUMAN BLOOD AND SIMULATED BLOOD ABSORPTION CAPACITY OF SAP OF DIFFERENT SAMPLES

ANNEX B

DETERMINATION OF SIMULATED BLOOD ABSORPTION RATE

[*Table* 1, *Sl No*. vii]

B-1 PRINCIPLE

The simulated blood absorption rate measurement is performed until the pre-set amount of simulated blood is absorbed. The time taken for 1 g of sodium polyacrylate resin to absorb 5.0 ml of simulated blood is measured.

B-2 REAGENTS

B-2.1 Simulated Blood

The solution of simulated blood shall be prepared according to Annex A.

B-3 APPARATUS

B-3.1 *Analytical Balance*, capable of weighing to the nearest 0.000 1 g.

B-3.2 *Glass Beaker*, 100 ml capacity.

B-3.3 *Glass Graduated Cylinder*, type A or B (laboratory glass ware) of 5 ml capacity (accurate to 0.1 ml).

B-3.4 *Timer*, accurate to 0.1 s over 60 min.

B-4 SAMPLING

In order to guarantee that a representative sample is taken from the bulk material contained in a large bag or a silo truck, remove the top layer (approximately 20 cm thick). Take a sample of 500 g or more with a scoop. Place it in an airtight container of adequate size within 3 min after sampling.

Keep the test samples in a closed container and allow them to equilibrate to the ambient laboratory temperature before taking a test portion to carry out the test. The preferred test conditions are 23 ± 1°C and 50 ± 10 percent relative humidity.

SAFETY PRECAUTIONS — USE RESPIRATORY PROTECTION, DUST MASK OR FUME HOOD WHEN HANDLING SAMPLE AMOUNTS GREATER THAN 10 G.

B-5 PROCEDURE

A minimum of two tests shall be carried out as follows.

B-5.1 Using the analytical balance (**B-3.1**), weigh 1.000 ± 0.005 g of sample to be tested to the nearest 0.001 g. Record the mass and place the sample into the beaker (**B-3.2**).

B-5.2 Shake or tap the beaker by hand so that the sample distributes in the bottom of the beaker evenly.

B-5.3 Use a glass graduated cylinder (**B-3.3**) to measure 5.0 ml of simulated blood (prepared according to **B-2.1**) at 23 ± 1°C. Pour the test solution into the Centre portion of the glass beaker (**B-5.2**) and simultaneously start the timer.

B-5.4 Stop the timer and record the time, *t*, when the simulated blood solution is fully absorbed into the sample.

NOTE — One way to check the full absorption is to allow the beaker to tilt slightly and observe if any solution remains or not.

B-6 CALCULATION

Calculate the arithmetic mean value from the simulated blood absorption rate measurements made, rounded to an integer, expressed in seconds.

The absorption rate is calculated as the time taken for 1.0 g of SAP to absorb 5.0 ml of simulated blood solution.

ANNEX C

DETERMINATION OF WHITENESS

[*Table* 1, *Sl No*. viii and Table 2, *Sl* No. viii]

C-1 The physical appearance of sodium polyacrylate resin is white solid. Whiteness shall be measured with a whiteness meter by using the test conditions specified in IS/ISO 2470-2. Pour the specimen into a cylinder-shaped container made of clear glass and measure the tristimulus values using the reflection method. The specimen container shall be covered with a light trap.

ANNEX D

DETERMINATION OF HEAVY METALS

[*Table* 2, *Sl No*. ix]

D-1 PRINCIPLE

Heavy metals contained as impurities are determined by this method. The heavy metals are the metallic inclusions that are darkened with sodium sulphide in acidic solution, as their quantity is expressed in terms of quantity of lead (Pb).

NOTE — Sodium Sulphide TS (Dissolve 5 g of sodium sulfide enneahydrate in a mixture of 10 ml of water and 30 ml of glycerin. Or dissolve 5 g of sodium hydroxide in a mixture of 30 ml of water and 90 ml of glycerin, saturate a half volume of this solution with hydrogen sulfide, while cooling, and mix with the remaining half. Preserve in well-filled, light-resistant bottles. Use within 3 months.)

D-2 REAGENTS

2.1 Nitric Acid;

2.2 Sulphuric Acid;

2.3 Hydrochloric Acid;

2.4 Water;

2.5 Phenolphthalein;

2.6 Ammonia;

2.7 Acetic Acid;

2.8 Sodium Sulphide; And

2.9 Standard Lead Solution.

D-3 PREPARATION OF TEST SOLUTION AND CONTROL SOLUTION

D-3.1 Unless otherwise specified, test solutions and control solutions are prepared as mentioned below.

D-3.2 Preparation of Test Solution

D-3.2.1 Place a 1.00 ± 0.01 g of the sample, in a quartz or porcelain crucible, cover loosely with a lid, and carbonize by gentle ignition. After cooling, add 2 ml of nitric acid and 5 drops of sulphuric acid. Heat cautiously until white fumes are no longer evolved, and incinerate by ignition between 500˚C and 600˚C. Cool, and add 2 ml of hydrochloric acid. Evaporate it to dryness on a water bath. Moisten the residue with 3 drops of hydrochloric acid, add 10 ml of hot water, and warm for 2 min. Then add 1 drop of phenolphthalein TS, add ammonia TS drop wise until the solution develops a pale red colour, add 2 mL of dilute acetic acid, filter if necessary, and wash with 10 ml of water. Transfer the filtrate and washing to a Nestle tube and add water to make 50 ml.

NOTES

1 Phenolphthalein TS — Dissolve 1 g of phenolphthalein in 100 ml of ethanol (C_2H_5OH [K 8102, Special Class]).

2 Ammonia TS — To 400 ml of ammonia solution (NH_3 [K 8085, Ammonia Water, Special Class, Density: about 0.90 g/mL, Content: 28 – 30 percent]) add water to make 1 000 ml (10 percent).

D-3.3 Preparation of Control Solution

D-3.3.1 Evaporate mixture of 2 ml of nitric acid, 5 drops of sulfuric acid and 2 ml of hydrochloric acid on a water bath. Further evaporate to dryness on a sand bath and moisten the residue with 3 drops of hydrochloric acid. Hereinafter, proceed as mentioned in the test solution (*see* **D-3.2.1**), then add 10 ml of standard lead solution and water to make 50 ml.

D-4 PROCEDURE

D-4.1 Add 1 drop sodium sulphide TS to each of the test solution and the control solution, mix thoroughly, and allow to stand for 5 min.

D-5 REPORT

Compare the colours of both the solutions by viewing the tubes downwards or transversely against a white background. The test solution has no more colour than the control solution.

ANNEX E

(*Foreword*)

COMMITTEE COMPOSITION

Plastics Sectional Committee, PCD 12

Organization	*Representative(s)*
Central Institute Of Plastics Engineering and Technology (CIPET), Chennai	Prof (Dr) Shishir Sinha (***Chairperson***) Dr S. N. Yadav Dr Smita Mohanty (*Alternate*)
All India Plastics Manufacturers Association (Aipma), New Delhi	Shri Deepak Ballani
Central Pollution Control Board, New Delhi	Ms Divya Sinha Shri C. K. Dixit (*Alternate*)
Chemical And Petrochemical Manufactures Association (CPMA) New Delhi	Shri Mahinder Singh
Coca-Cola India Pvt. Ltd., Gurugram	Shri Virendra Landge Shri Rajendra Dobriyal (*Alternate*)
Consumer Association Of India (CONCERT), Chennai	Shri G. Santhanarajan Shri M. R. Krishnan (*Alternate*)
Csir-Central Food Technological Research Institute (Cftri), Mysore	Shri R. S. Matche Shri Keshava Murthy. P. (*Alternate*)
CSIR-Indian Institute Of Toxicological Research (IITR), Lucknow	Dr V.P. Sharma Dr A.B. Pant (*Alternate*)
Csir- National Chemical Laboratory (Ncl), Pune	Dr P. R. Suresha Dr R. V. Gundloori (*Alternate*) Shrimati Sangeeta Hambir (*Alternate*)
Department Of Chemicals and Petrochemicals, Min. Of Chemicals and Fertilizers, New Delhi	Shri O. P. Sharma Shri Varun Singh Poonia (*Alternate*)
Food Corporation Of India (FCI), Delhi	Shri Rajagopal. A. Shri A. K. U. B. Singh (*Alternate*)
Food Safety And Standards Authority Of India (FSSAI), Delhi	Shri Chirag Gadi
Gail (India) Ltd., Noida	Shri Manish Khandelwal
Haldia Petrochemicals Limited, Kolkata	Shri Raj K. Datta Shri Suvomoy Ganguly (*Alternate*)
Hmel, Noida	Shri Vineet Kumar Gupta Shri Alakesh Ghosh (*Alternate*)

Organization	*Representative(s)*
Huhtamaki Paper Product Ltd. (Hppl), Hyderabad	Shri Muthusamy Chockalingam Shri Aishwarya Vange (*Alternate*)
Ifca, Mumbai	Shri Atindra N. Chaudhuri
Indian Centre For Plastics In The Environment (ICPE), Mumbai	Shri T.K. Bandopadhyay
Indian Institute Of Packaging (IIP), Mumbai	Shri Madhab Chakraborty Dr Tanweer Alam (*Alternate*)
Indian Institute Of Technology (IIT), Delhi	Shri Anup K Ghosh
Indian Oil Corporation, R and D Centre, Faridabad	Shri G. S. Kapoor Shri Dhananjay Sahoo (*Alternate*)
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Indian Plastic Institute (Ipi), Mumbai	Shri V. B. Lall Shri Mihir Banerji (*Alternate*)
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